Internal Use Only

LG

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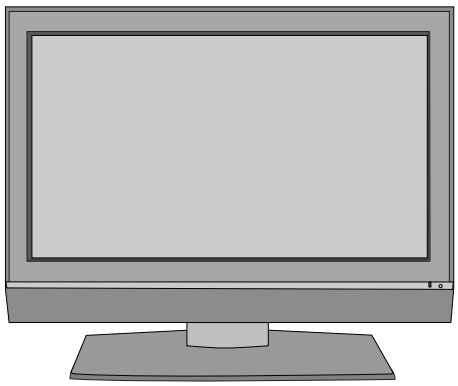
PLASMA TV
SERVICE MANUAL

CHASSIS : PP78D

MODEL : 32PC5DVC 32PC5DVC-UG

CAUTION

BEFORE SERVICING THE CHASSIS,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.



SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and Replacement Parts List.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent X-RADIATION, Shock, Fire, or other Hazards.
Do not modify the original design without permission of manufacturer.

General Guidance

An **Isolation Transformer should always be used** during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and it's components from being damaged by accidental shorts of the circuitary that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this monitor is blown, replace it with the same specified type.

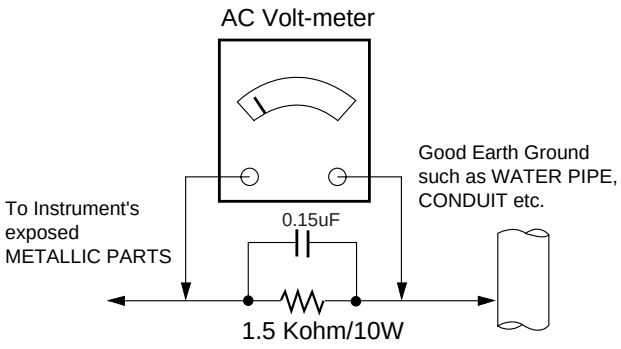
When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1W), keep the resistor 10mm away from PCB.

Keep wires away from high voltage or high temperature parts.

Leakage Current Cold Check(Antenna Cold Check)
With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on positioin, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.
If the exposed metallic part has a return path to the chassis, the measured resistance should be between 1MΩ and 5.2MΩ.
When the exposed metal has no return path to the chassis the reading must be infinite.
An other abnormality exists that must be corrected before the receiver is returned to the customer.

Leakage Current Hot Check (See below Figure)
Plug the AC cord directly into the AC outlet.
Do not use a line Isolation Transformer during this check.
Connect 1.5K/10watt resistor in parallel with a 0.15uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.
Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.
Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each esposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which is corresponds to 0.5mA.
In case any measurement is out of the limits sepcified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

Leakage Current Hot Check circuit



CANADA: LG Electronics Canada, Inc. 550 Matheson
Boulevard East Mississauga, Ontario L4Z 4G3

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P.O.Box 240007, 201 James Record Road Huntsville,
AL 35824
Digital TV Hotline 1-800-243-0000

TABLE OF CONTENTS

SPECIFICATIONS

The specifications shown above may be changed without prior notice for quality improvement.

MODELS		32PC5DVC (32PC5DVC-UG)
Dimensions (Width x Height x Depth)	Including stand Excluding stand	32.3 x 23.8 x 10.1 inches 819.9 x 603.8 x 255.4 mm 32.3 x 21.8 x 3.1 inches 819.9 x 554.2 x 78.1 mm
Weight	including stand excluding stand	36.8 pounds / 16.7 kg 34.8 pounds / 15.8 kg
Power requirement Television System Program Coverage External Antenna Impedance		AC100-240V ~ 50/60Hz NTSC-M, ATSC, 64 & 256 QAM VHF 2-13, UHF 14-69, CATV 1-135, DTV 2-69, CADTV 1-135 75 ohm
Environment condition	Operating Temperature Operating Humidity	32 ~ 104°F (0 ~ 40°C) Less than 80%
	Storage Temperature Storage Humidity	-4 ~ 140°F (-20 ~ 60°C) Less than 85%

ADJUSTMENT INSTRUCTIONS

1. Application Range

This spec sheet is applied to all of the PP78D chassis .

2. Specification

(1) Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of isolation transformer will help to protect test instruments.
(2) Adjustment must be done in the correct sequence.
(3) The adjustment must be performed at 25±5°C temperature and 65±10% relative humidity if there is no specified designation.
(4) The input voltage of the receiver must be kept between 100~220V, 50/60Hz.
(5) Before adjustment, execute Heat-Run for 30 minutes at RF no signal.

3. ADC Calibration

	Component	RGB
MSPG-925FA	Model: 216 (720p@60Hz)	Model: 46 (800x600@60Hz)

3-1. PC input ADC

(1) Auto RGB Gain/Offset Adjustment

1) Convert to PC in Input-source
2) Signal equipment displays
Output Voltage : 700 mVp-p
Impress Resolution XGA (800 x 600 @ 60Hz)
Model : 46 in Pattern Generator
Pattern : 29 in Pattern Generator (MSPG-925 SERISE)
[gray pattern that left & right is black and center is white signal (Refer below picture)]

Adjustment pattern (PC)

3) Adjust by commanding AUTO_COLOR_ADJUST(0xF1) 0x00 0x02 instruction.

(2) Confirmation

1) We confirm whether “0xB6(RGB)” address of EEPROM “0xA2” is “0xAA” or not.
2) If “0xB6(RGB)” address of EEPROM “0xB2” isn’t “0xAA”, we adjust once more
3) We can confirm the ADC values from “0xB0~0xB5(RGB)” addresses in a page “0xA2”

[Manual ADC process using Service Remocon. After enter Service Mode by pushing “ADJ” key, execute “ADC Adjust” by pushing “G” key at “Adjust-RGB”.

3-2. COMPONENT input ADC

(1) Component Gain/Offset Adjustment

1) Convert to Component in Input-source
2) Signal equipment displays

Impress Resolution 720P
MODEL : 216 in Pattern Generator(720P Mode)
PATTERN : 08 in Pattern Generator(MSPG-925 SERISE)

Adjustment pattern (COMPONENT)

3) Adjust by commanding AUTO_COLOR_ADJUST(0xF1) 0x00 0x02 instruction

(2) Confirmation

1) We confirm whether “0xC8(720P)” address of EEPROM “0xA2” is “0xAA” or not.
2) If “0xC8(720P)” address of EEPROM “0xA2” isn’t “0xAA”, we adjust once more
3) We can confirm the ADC values from “0xB9~0xBE(480i)/0xC2~(1080i)” addresses in a page “0xA2”

3-3. Function Check

(1) Check display and sound

1) Check Input and Signal items. (cf. work instructions)
   1. TV
   2. AV (CVBS/ S-Video)
   3. COMPONENT (480i)
   4. RGB (PC : 1024 x 768 @ 60hz)
   5. HDMI
   6. PC Audio In and H/P Out

   * Display and Sound check is executed by Remote controller.

Caution: Each PCB assembly must be checked by check JIG set. (Because power PCB Assembly damages to PDP Module, especially be careful)

4. EDID

[Caution

(1) Use the proper signal cable for EDID Download
- Analog EDID : Pin3 exists
- Digital EDID : Pin3 exists

(2) Never connect HDMI & DVI-D & DVI-A Cable at the same time.

(3) Use the proper cables below for EDID Writing

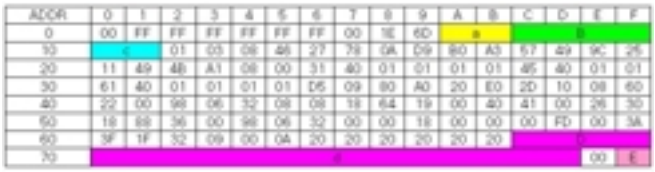
For RGB EDID	For HDMI EDID	
		

4-1. EDID Data

Item	Condition	Hex Data
Manufacturer ID	GSM	1E6D
Version	Digital : 1	01
Revision	Digital : 3	03

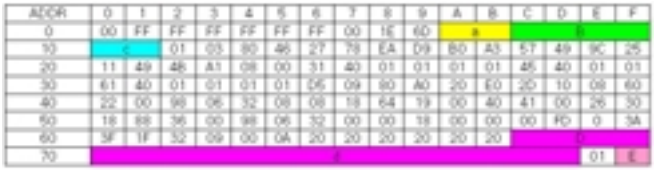
(1) 32PC5DV ANALOG(128 Bytes)

o BLOCK1 (128BYTE)

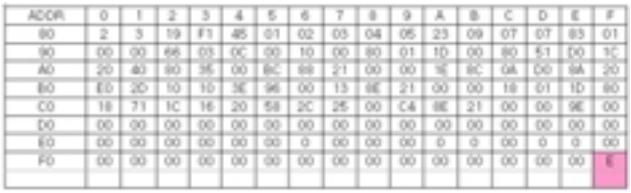


(2) 32PC5DV HDMI(256 Bytes)

o BLOCK1 (128BYTE)

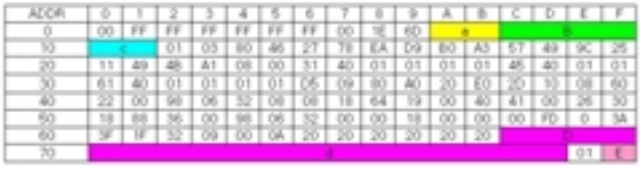


o BLOCK2 (128BYTE)

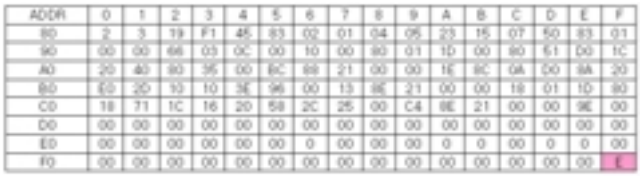


(2) 32PC5DVC HDMI(256 Bytes)

o BLOCK1 (128BYTE)



o BLOCK2 (128BYTE)



ⓐ Product ID

Model Name	Product ID	Product ID		
		Dec	Hex	EDID table
32PC5DVC-UG	75FD(A)	30205	75FD	FD75
	75FE(D)	30206	75FE	FE75

ⓑ Serial No
=> Controlled on production line

ⓒ Month, Year
=> Controlled on production line:
ex) Monthly: '11' -> '0B'
Year: '2006' -> '10'

ⓓ Model Name/Monitor Name

모델명																	
LG TV-	00	00	00	PC	00	4C	47	54	56	0A	20	20	20	20	20	20	20	20

ⓔ Checksum(7EH)
=> Changeable by total EDID data

4-2. Required Test Equipment

(1) Adjusting PC with S/W for writing EDID Data.(S/W : EDID TESTER Ver.2.5)
(2) A Jig for EDID Download
(3) Cable : Serial(9Pin or USB) to D-sub 15Pin cable, D-sub 15Pin cable, DVI to HDMI cable.

(Fig. 1) Connection Diagram of DDC Download

4-3. Preparation for Adjustment

(1) As above (Fig. 1), Connect the Set, EDID Download Jig,, PC & Cable
(2) Turn on the PC & EDID Download Jig. And Execute the S/W : EDID TESTER Ver.2.5
(3) Set up the S/W option
Repeat Number : 5
Device Address : A0
PageByte : 8

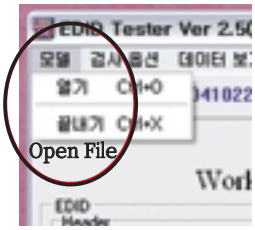
(4) Power on the Set

4-4. Sequence of Adjustment

DDC data of Analog-RGB

(1) Init the data

(2) Load the EDID data.(Open File).

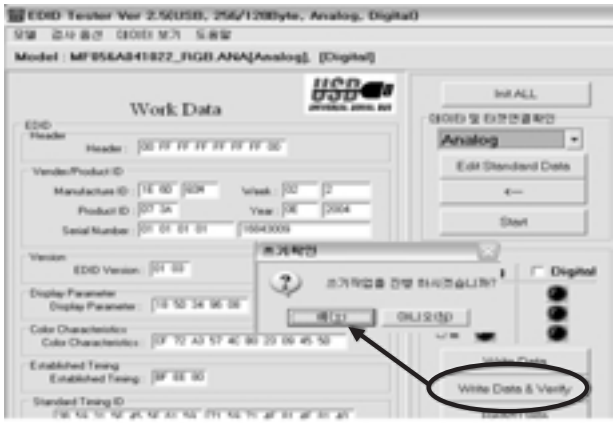


[Analog – RGB : PP78D_RGB.ANA]

[Digital – HDMI : PP78D_HDMI.DVI]

(3) Set the S/W as below.

(4) Push the “Write Data & Verify” button. And confirm “Yes”.



(5) If the writing is finished, you will see the “ OK” message.

5. HDCP(High-Bandwidth Digital Contents Protection)

(1) Connect D-sub Signal Cable to D-Sub Jack
(2) Input HDCP key with HDCP-key- in-program
(3) HDCP Key value is stored on EEPROM(AT24C512) which is 80~A1 addresses of 0xA0~0xA2 page
(4) AC off/ on and on HDCP button of MSPG925 and confirm whether picture is displayed or not of using MSPG925
(5) HDCP Key value is different among the sets

6. Adjustment of White Balance

6-1. Purpose and Principle for Adjustment of the Color Temperature

(1) Purpose: Adjust the color temperature to reduce the deviation of the module color temperature.
(2) Principle: To adjust the white balance without the saturation, Fix the one of R/G/B gain to 80 and decrease the others.

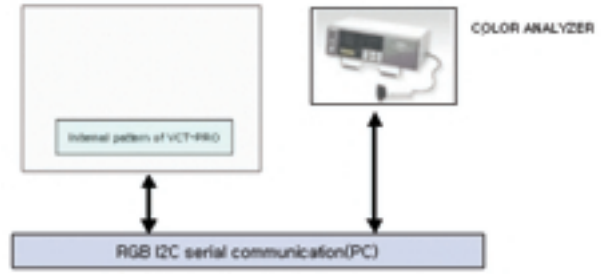
6-2. Adjustment Mode

Two modes of Cool and Warm
(Medium data is automatically calibrated by the cool data)

6-3. Required Equipment

(1) Remote controller for adjustment
(2) Color Analyzer : CA100, CA-100+, CA-210 or same product
- PLASMA TV(ch : 10)
(3) Auto W/B adjustment instrument(only for Auto adjustment)

6-4. Connecting Diagram of Equipment for Measuring (For Automatic Adjustment)



(1) Enter the adjustment mode of the white balance
1) Enter the white balance adjustment mode at the same time heat-run mode when pushing the power on by power only key
2) Maintain the white balance adjustment mode with same condition of Heat-run -> Maintain after AC off/on in status of Heat-run pattern display

(2) Release the white balance adjustment mode
1) Release the adjust mode after AC off/on or std-by off/on in status of finishing the Hear-run mode
2) Release the Adjust mode when receiving the aging off command(F3 00 00) from adjustment equipment
3) Need to transmit the aging off command to TV set after finishing the adjustment

o Standard color coordinate and temperature when using the CA-100+ or CA210 equipment

Mode	Color Coordinate		Temp	3uv
	X	Y		
Cool	0.276±0.003	0.283±0.003	11,000K	0.000
Medium	0.285±0.003	0.293±0.003	9,300K	0.000
Warm	0.313±0.003	0.329±0.003	6,500K	0.003

o Synchronization relation between PSM and CSM

PSM	CSM	Remark
Dynamic	Cool	
Standard	Normal	
Mild	Warm	

(3) DDC adjustment Command set

Adjustment	CMD(HEX)	ADR	VALUE	Detail
Aging On/Off	F3	00	255/00	OO : OFF 01 : ON FF : WB Ready
Input select	F4	00		0x10 : TV 0x20 : AV1 0x21 : AV2 0x23 : AV3 0x40 : Component1 0x50 : RGB DTV 0x60 : RGB PC 0x90 : HDMI1 DTV
R GAIN	16	00	00 - 255	GAIN adjustment
G GAIN	18		00 - 255	CSM COOL
B GAIN	1A		00 - 255	
R GAIN	16	01	00 - 255	GAIN adjustment
G GAIN	18		00 - 255	CSM NORMAL
B GAIN	1A		00 - 255	
R GAIN	16	02	00 - 255	GAIN adjustment
G GAIN	18		00 - 255	CSM WARM
B GAIN	1A		00 - 255	

[R/G/B GAIN max value : 80

6-5. Adjustment of White Balance for Manual Adjustment

(1) Adjustment mode: Two modes of Cool (Dynamic) and Warm(Mild)
(Medium data is automatically calibrated by the cool data)
(2) Color analyzer(CA110) should be used in the calibrated ch by CS-1000(PDP : CH10)
(3) Operate the zero-calibration of the CA-110 then stick sensor to the module when adjusting.
(4) For manual adjustment, it is also possible by the following sequence

1) Select white pattern of heat-run by pressing “POWER ON” key on remote control for adjustment then operate heat run longer than 15 minutes.
(If not executed this step, the condition for W/B will be differ)
2) Changing to the av mode by remote control.(av mode)
3) Display the internal pattern of the Mstar IC by pushing the ADJ.
4) Stick sensor to center of the screen and select each items (Red/Green/Blue Gain and Offset) using D/E(CH +/-) key on R/C.
5) Adjust R/ G/B Gain using F/G (VOL +/-) key on R/C.
6) Adjust two modes of Cool(Dynamic) and Warm(Mild) as below figure.
(Fix the one of R/G/B and change the others)

1. Push the one time the in-start key : Cool
2. Push the two more the in-start key : Warm

Mode	Color Coordinate		Temp	3uv
	X	Y		
Cool	0.276±0.003	0.283±0.003	11,000K	0.000
Medium	0.285±0.003	0.293±0.003	9,300K	0.000
Warm	0.313±0.003	0.329±0.003	6,500K	0.003

[Refer to the below case to know what value is fixed.

[CASE]
First adjust the coordinate much away from the target value (x, y).

1. x, y > target
Decrease the R, G.

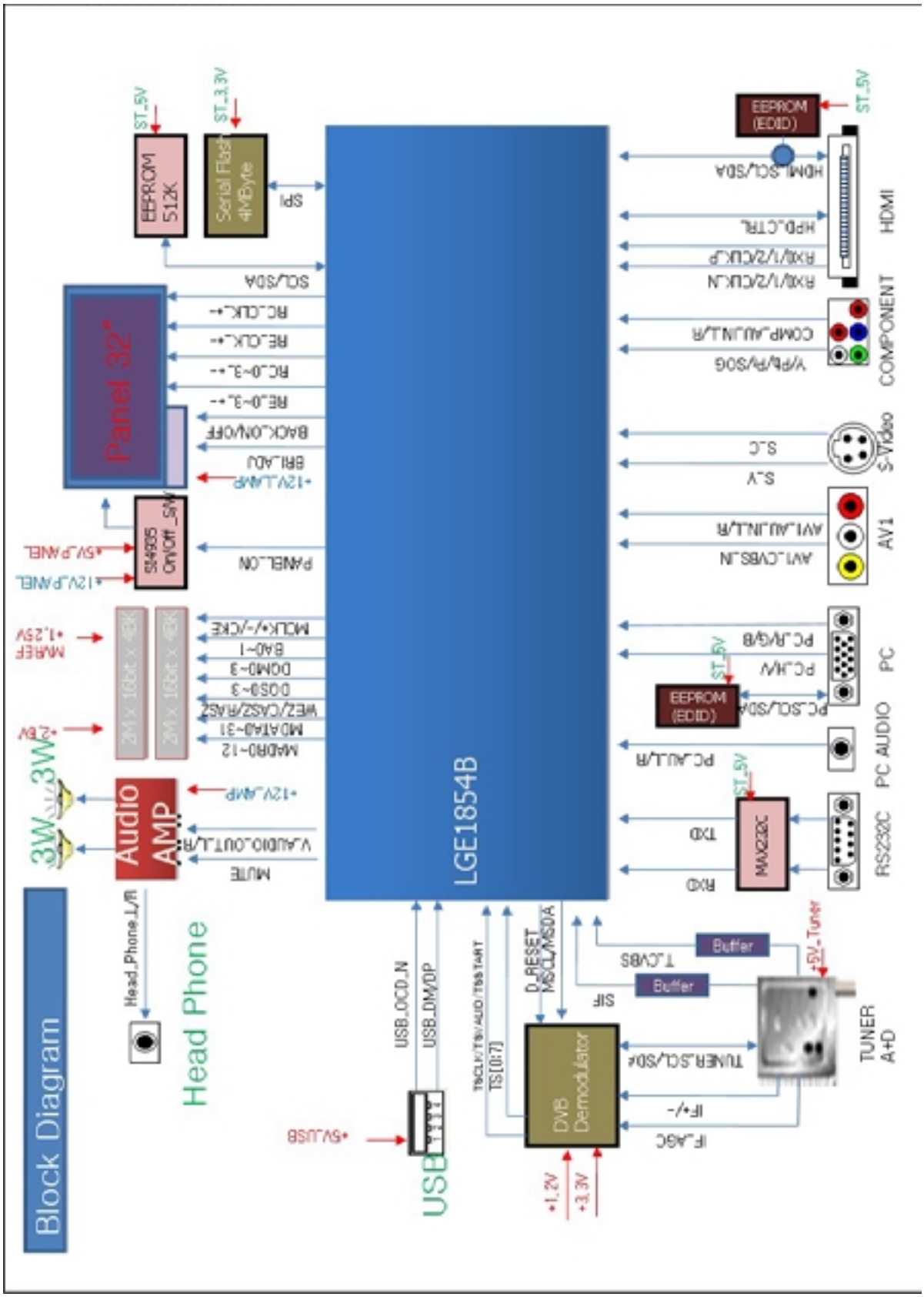
2. x, y < target
1) First decrease the B gain,
2) Decrease the one of the others.
- In case of decreasing the x, decreasing the R : fix G
- In case of decreasing the y , decreasing the G : fix R

3. x > target , y < target
1) First decrease B, so make y a little more than the target.
2) Adjust x value by decreasing the R

4. x < target , y > target
1) First decrease B, so make x a little more than the target.
2) Adjust x value by decreasing the G

7) When adjustment is completed, Exit adjustment mode using EXIT key on R/C

BLOCK DIAGRAM



EXPLODED VIEW

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and EXPLODED VIEW.
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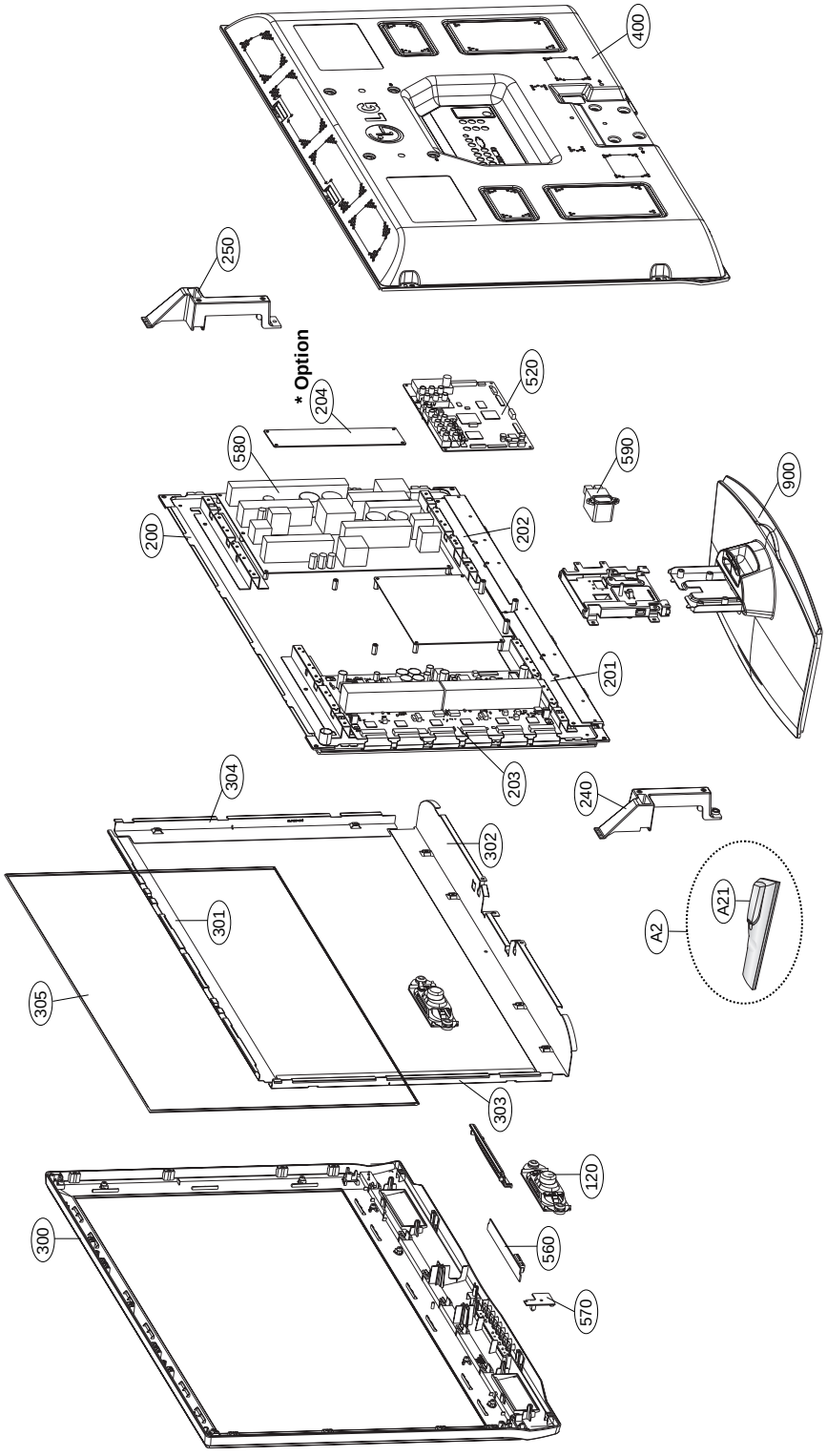

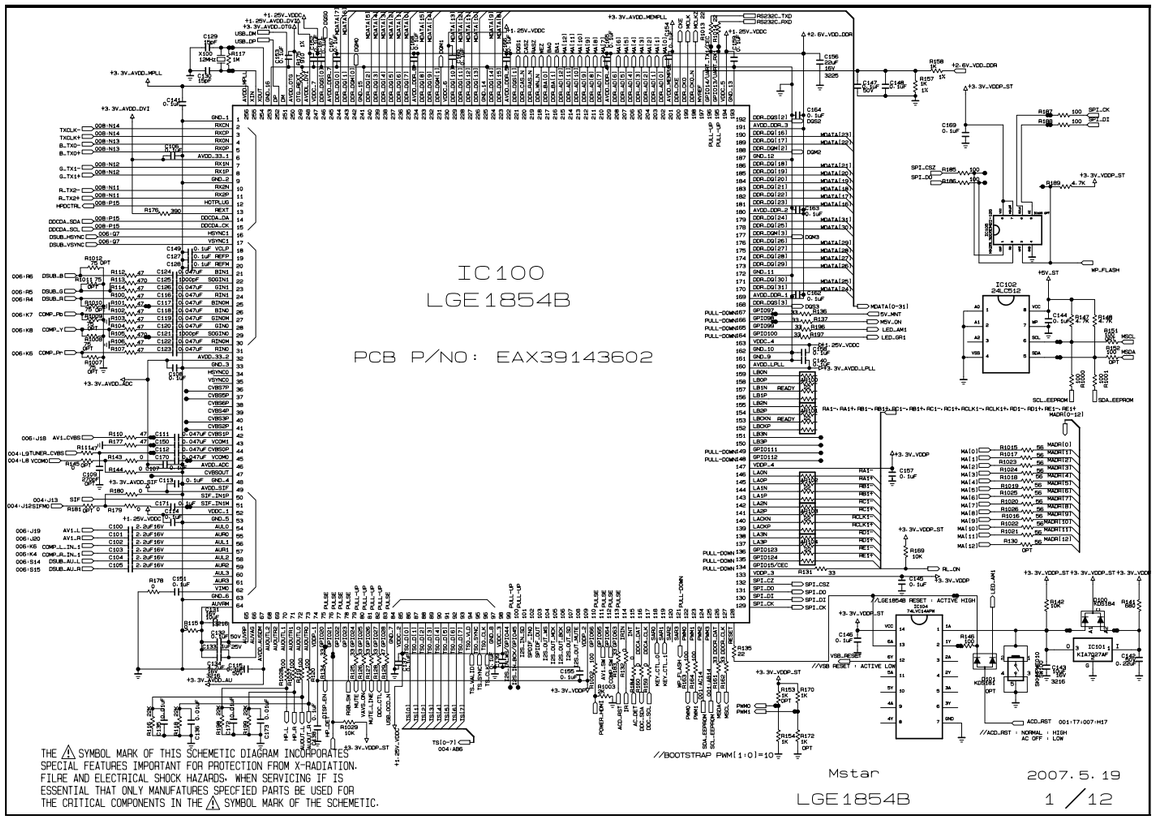

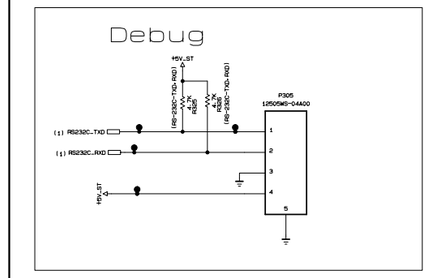

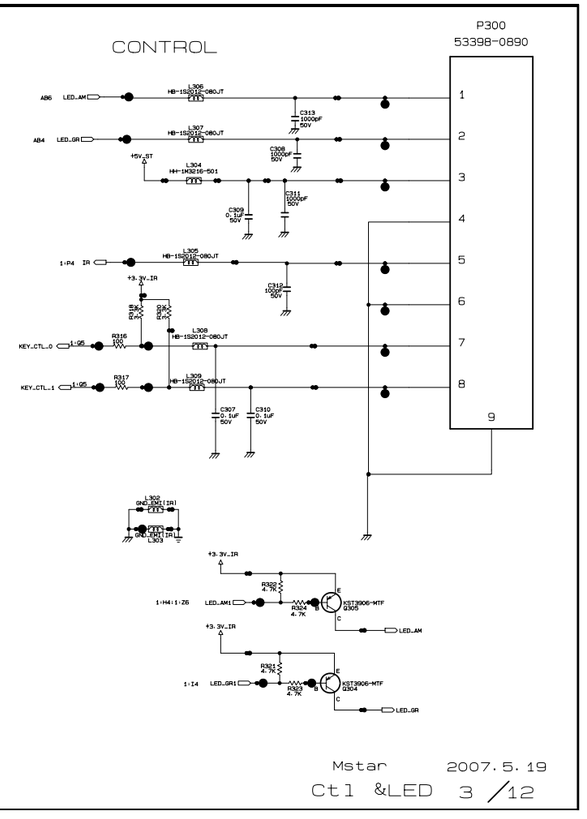

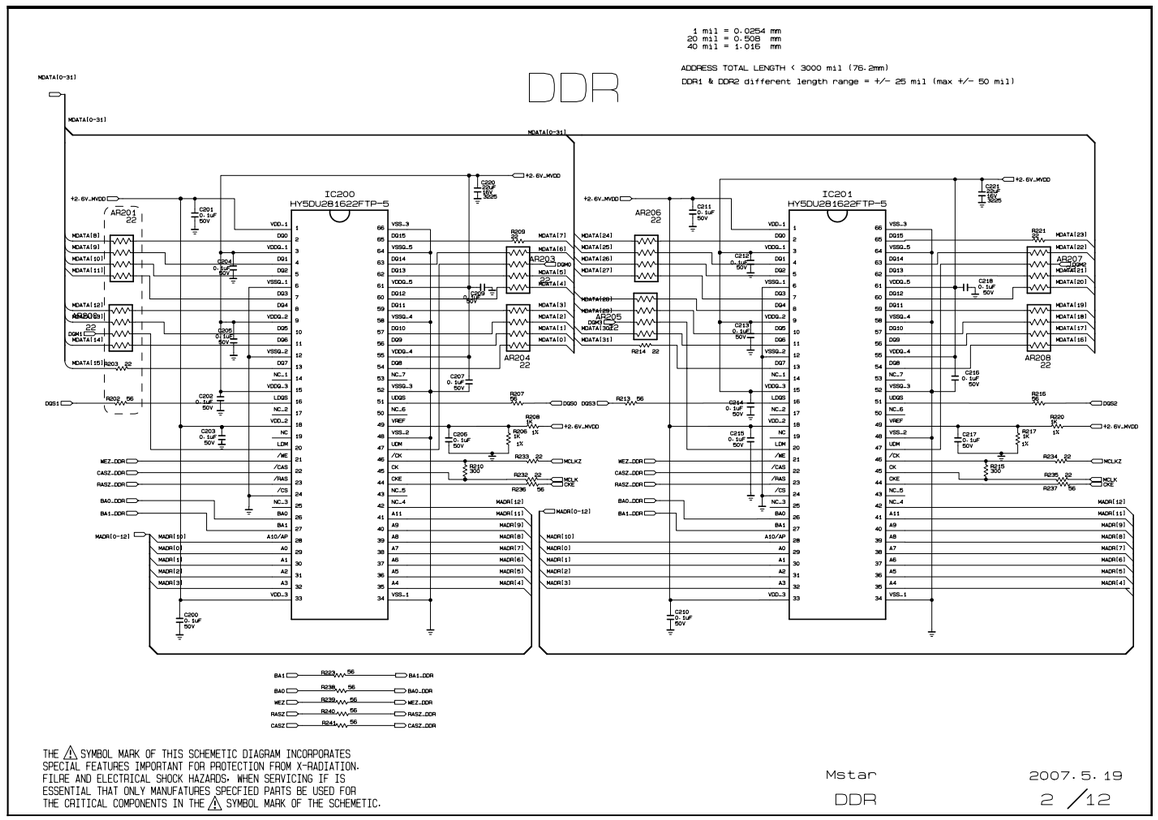

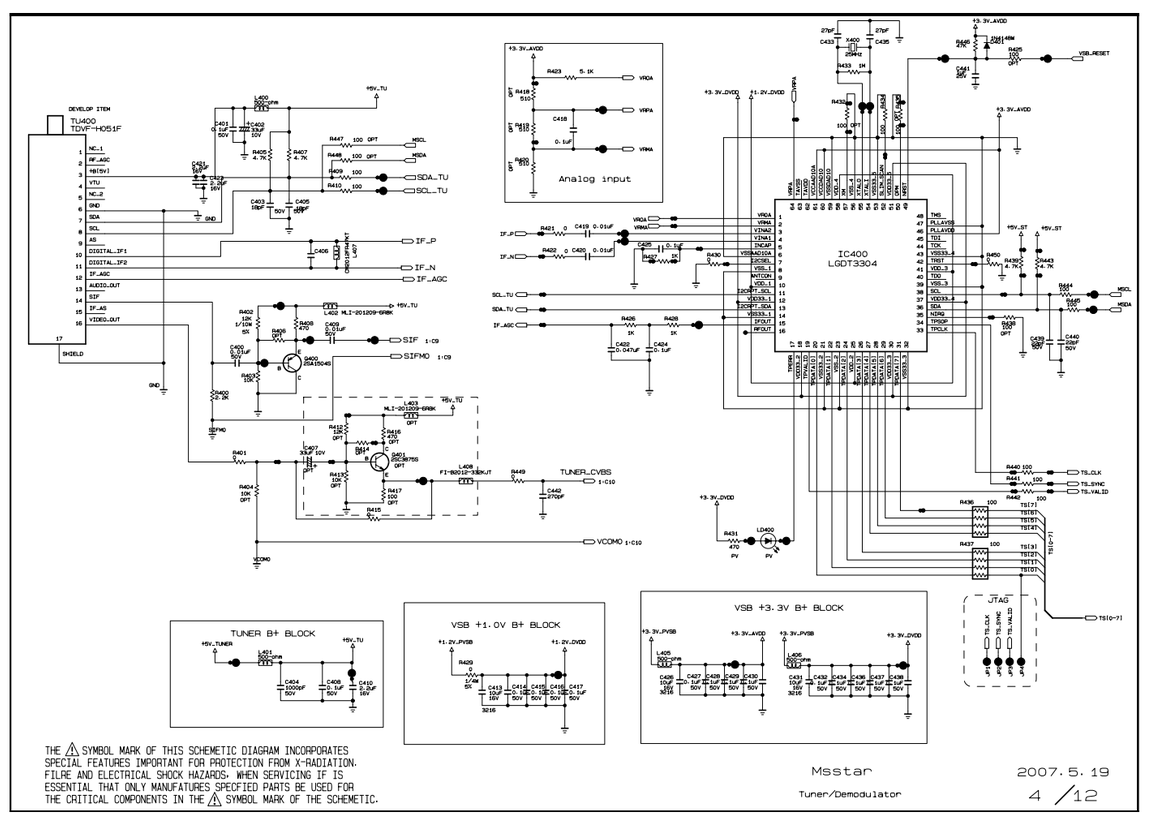

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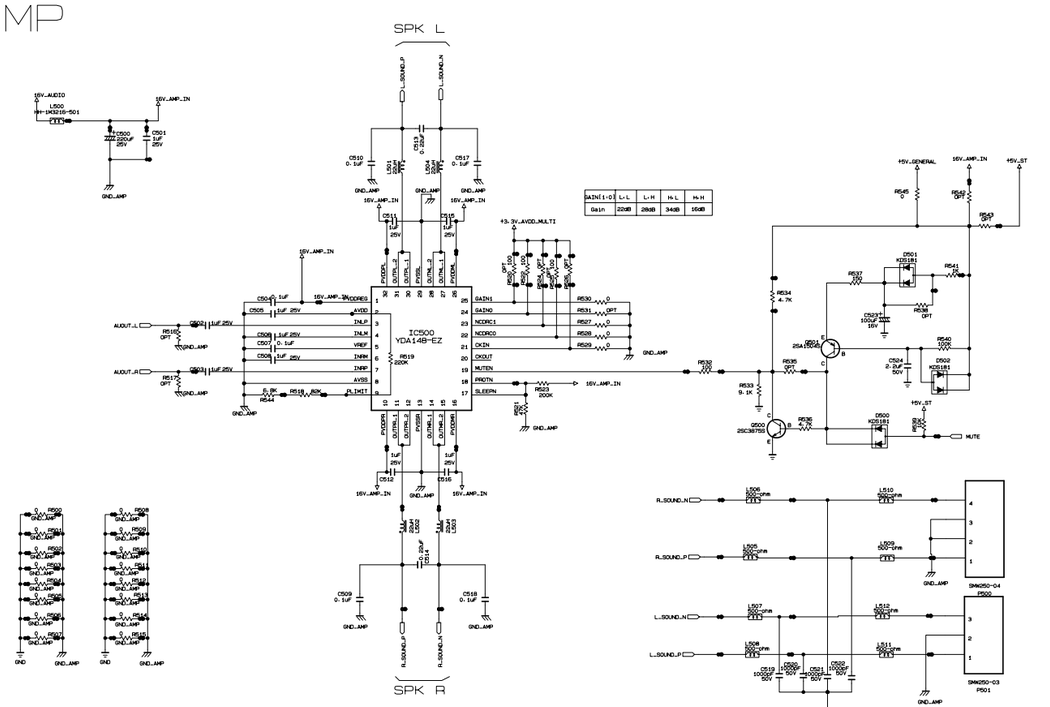

THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

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AMP
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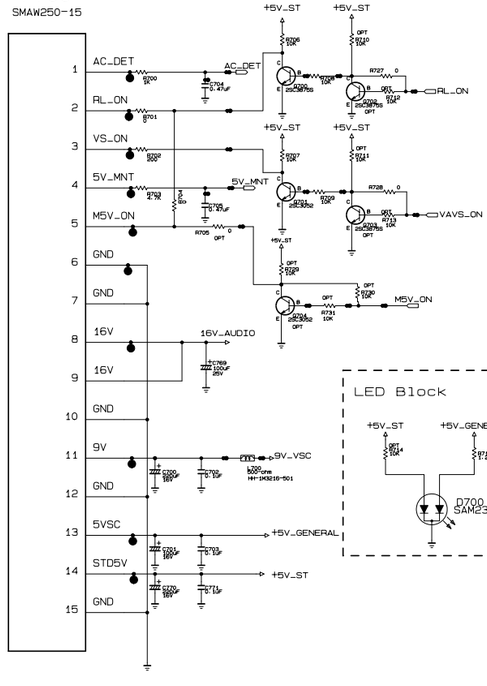
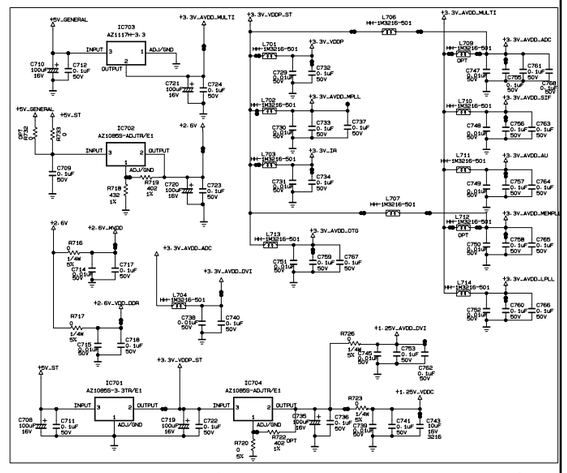
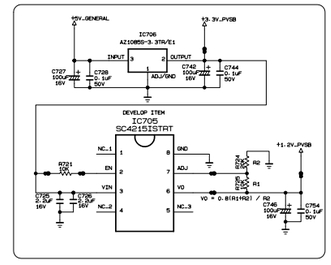
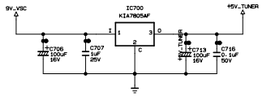
FROM LIPS & POWER B/D

P700
SMAW250-15









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Mstar
Power
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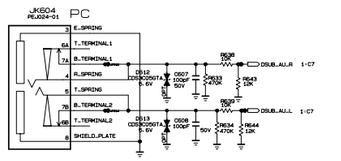
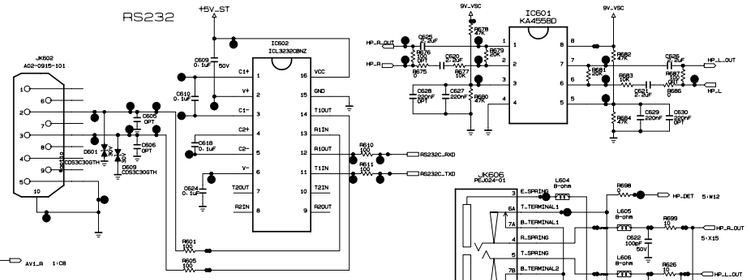
7 /12

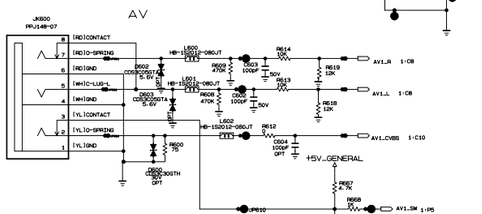
PC



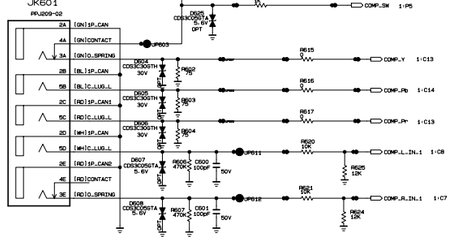
RS232

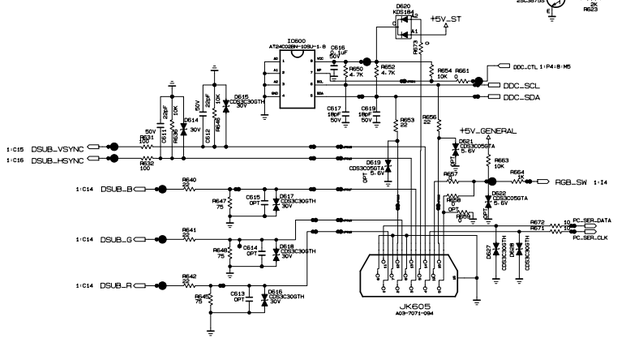


AV



COMPONENT

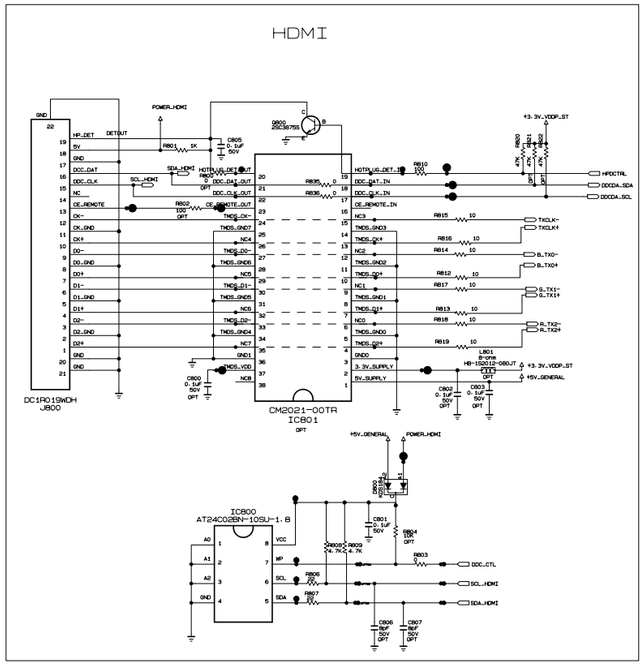




THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

Mstar
Interface
2007.05.19
6 /12

HDMI



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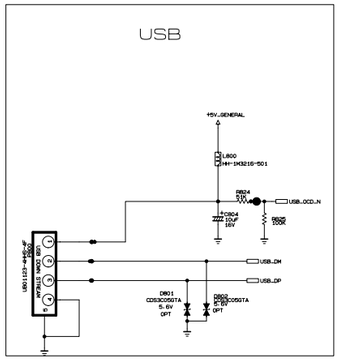
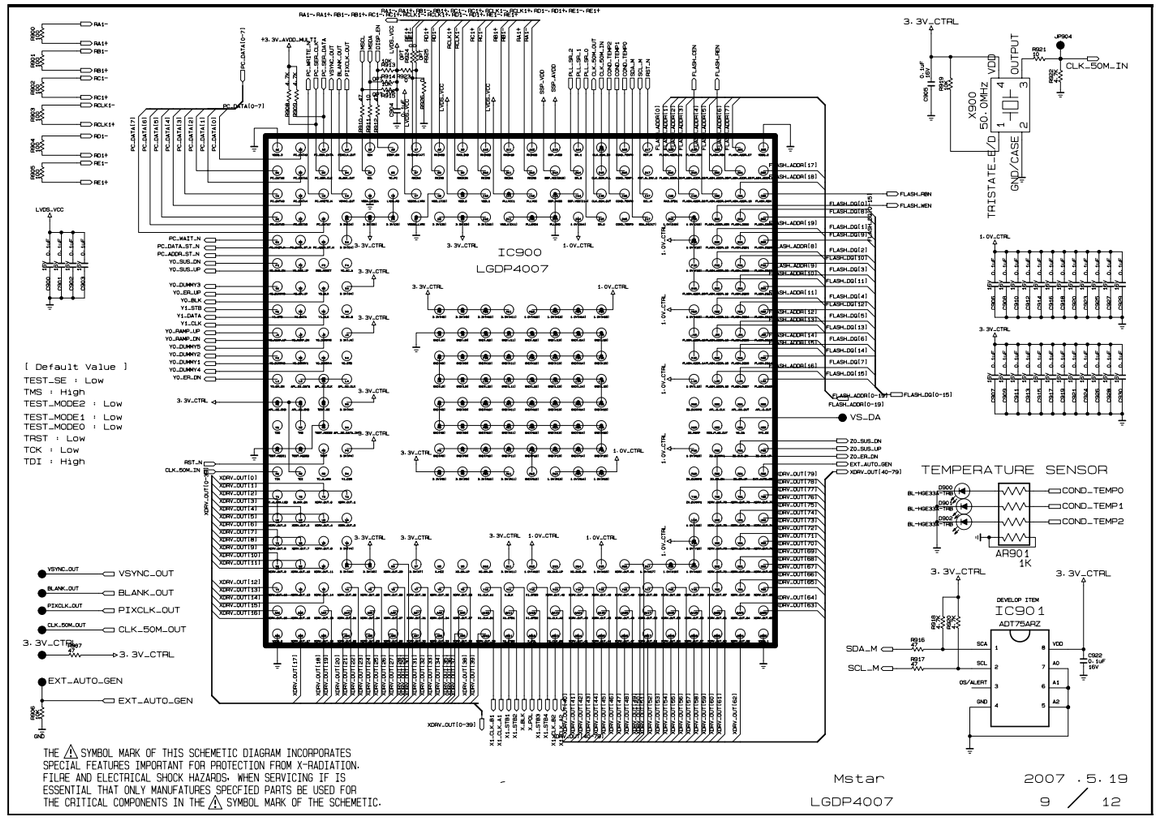
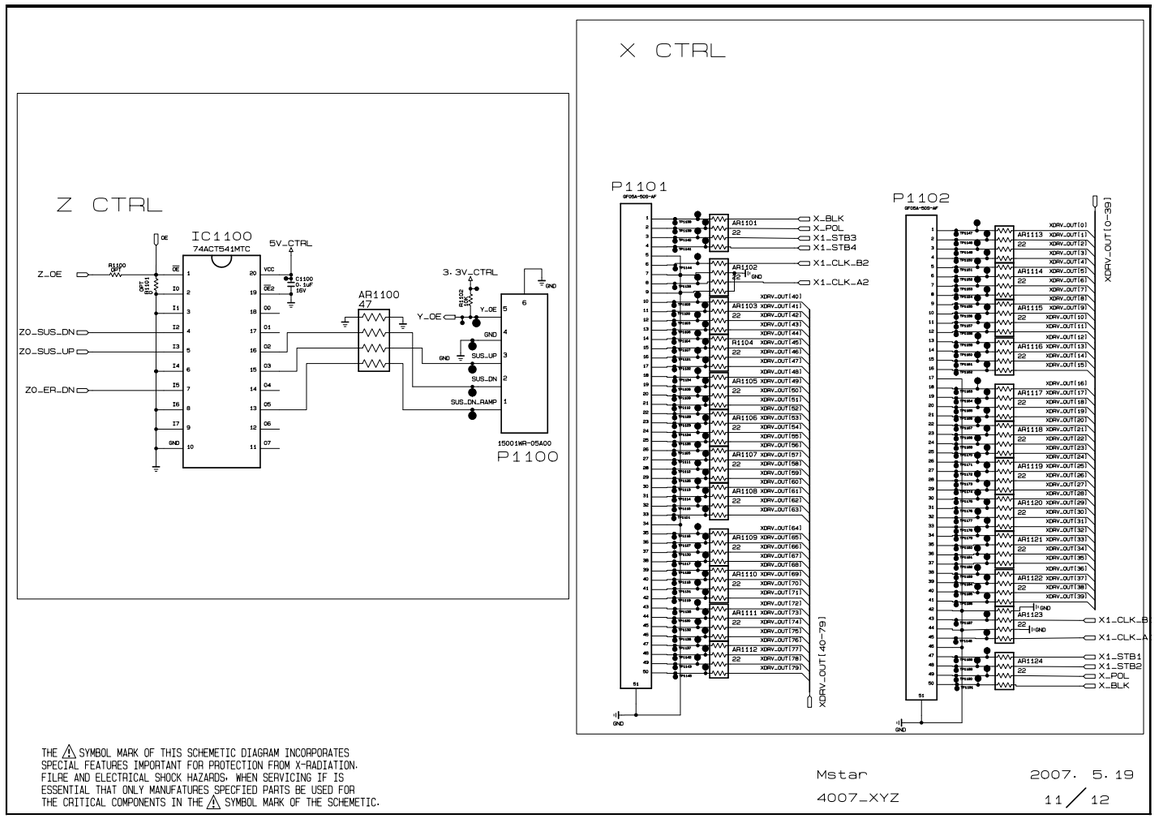
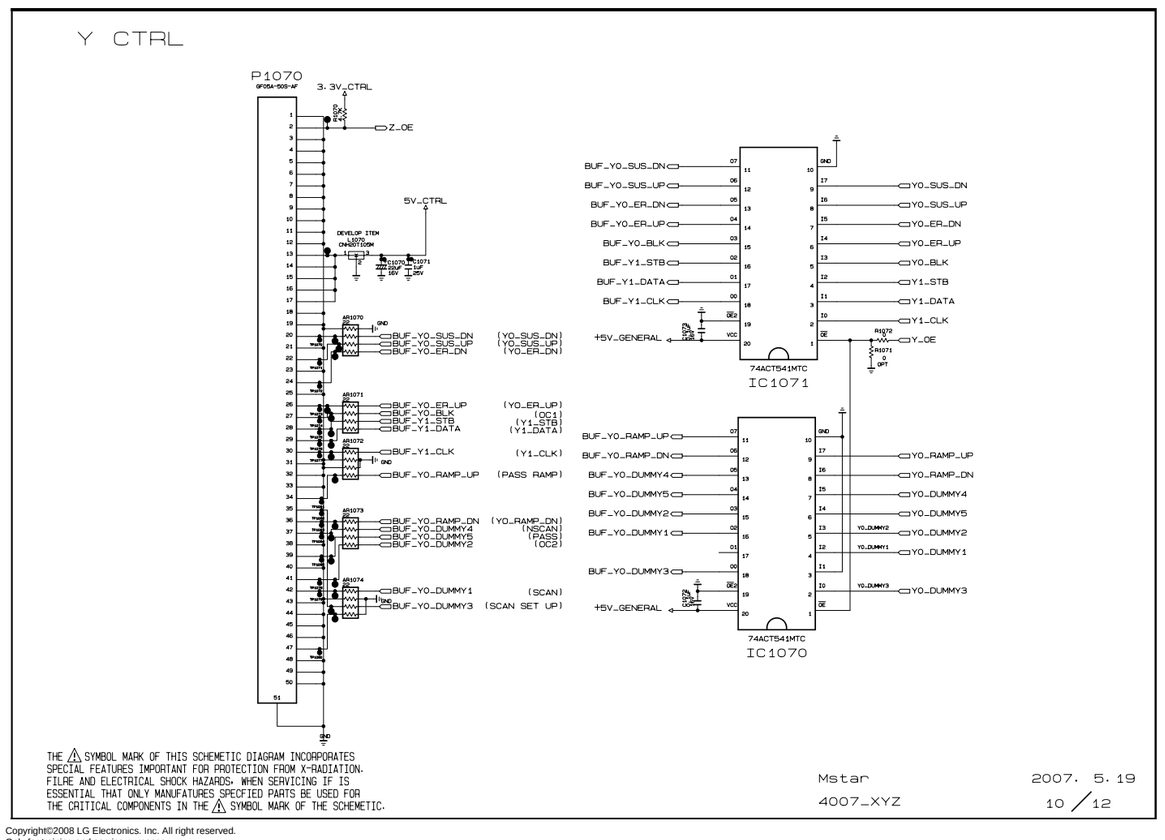


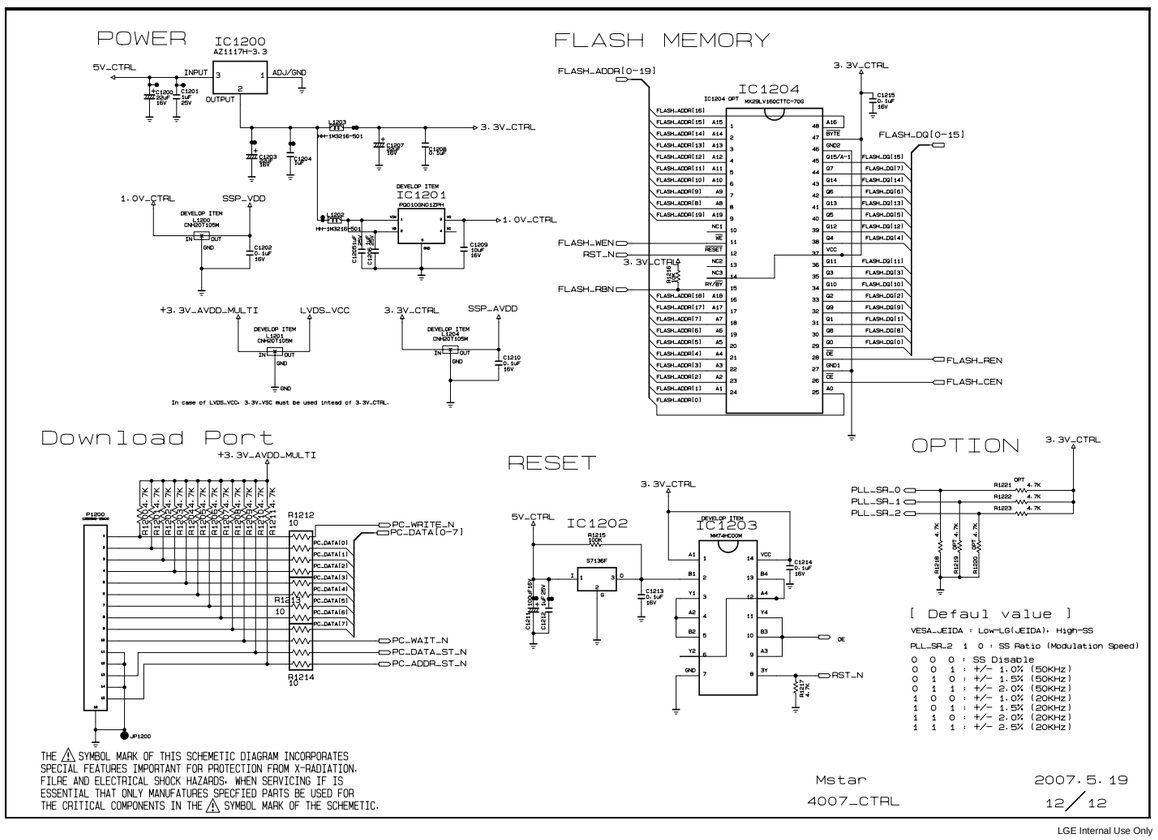
THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

Mstar
HDMI&USB
2007.5.17
8 /11









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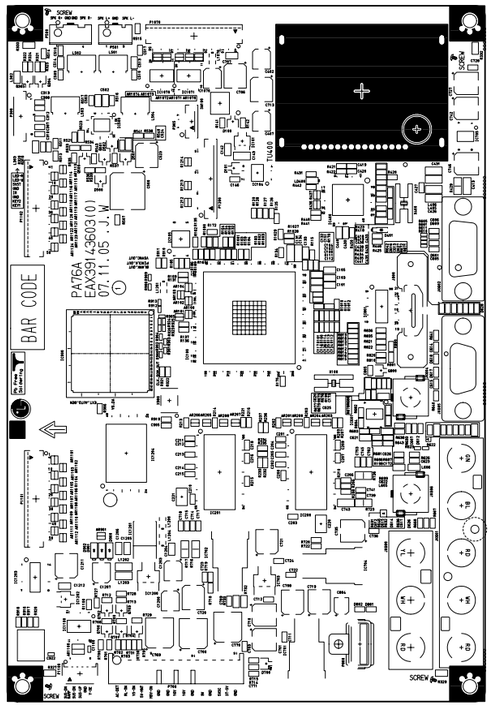

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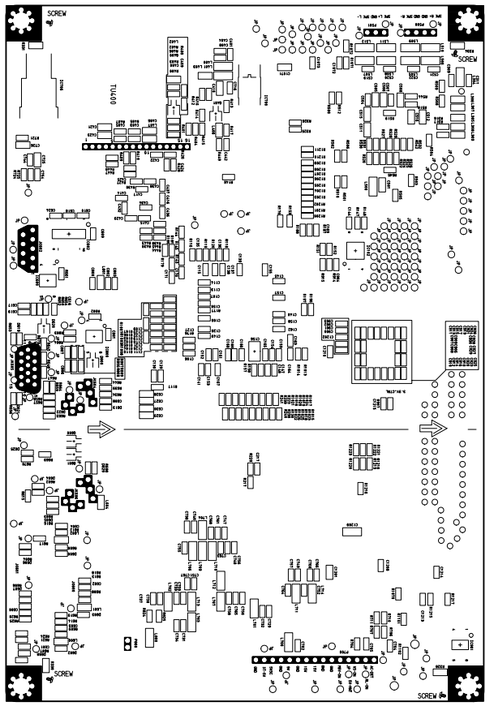

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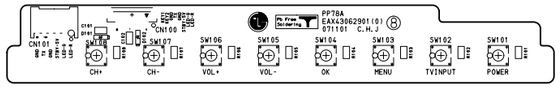

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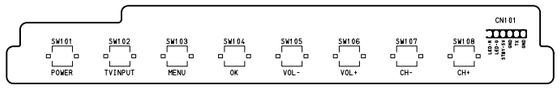

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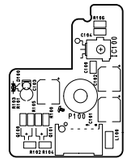

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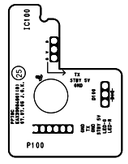

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